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Prewar, War-Zone, and Postwar Predictors of Posttraumatic Stress in Female Vietnam Veteran Health Care Providers

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Using the National Vietnam Veterans Readjustment Study database, we explored predictors of current posttraumatic stress disorder (PTSD) symptom severity in 373 female Vietnam veteran health care providers. We derived war-zone stressor scales to encompass general contextual and specific occupational stressors. To assess the comparative impact of war-zone stressors, we included measures of prewar and postwar factors in a multivariate model. PTSD symptom severity was significantly related to war-zone deprivation, dilemmas for health care providers, purposelessness, and unit cohesion. In contrast, the war-zone stressors more clearly identifiable as criterion-A-level traumatic exposure were not directly related to outcome. Results support the clinical relevance of war-zone occupational stressors while emphasizing the predominance of postwar emotional support and life events in the expression of chronic PTSD symptoms among this population.

Civilian health care providers, particularly females, often experience stress-related occupational burnout (e.g., Glass, McKnight, & Valdimarsdottir, 1993). Charac-

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teristics of the employment context associated with significant distress among health care providers and implicated in correlational models of burnout include: lack of meaning/accomplishment (McKnight & Glass, 1995), continuity of care (Reid & Moss, 1999), ethical conflicts, inadequate resources, exposure to suffering and death (Florio, Donnelly, & Zevron, 1998), physical danger (Mezey & Gillian, 1999), and low supervisor and peer support (Constable & Russell, 1986). If health care provision predisposes civilians to stress reactions, can the "burnout" models inform our understanding of chronic war-related distress among Vietnam veteran health care providers, whose occupational stress was compounded by stressors inherent in living and working in a war zone?

Experience as a war-zone health care provider has been shown to affect enduring war-related stress separately from other military trauma. Carson et al. (2000) found elevated physiological reactivity among female Vietnam nurse veterans with posttraumatic stress disorder (PTSD), relative to those without, only during imagery of Vietnam nursing-related trauma. No differences were found between the groups during imagery of Vietnam military trauma unrelated to nursing. The authors concluded that the professional role of these women was integral in determining the traumatogenicity of exposure to casualties. Similarly, Wolfe, Chrestman, Ouimette, Kaloupek, Harley, and Bucsela (2000) demonstrated increased physiological reactivity to cues of a war-zone evacuation and associated hospital procedures in female Vietnam veterans with, compared to those without, current PTSD.

To extend and bridge previous findings concerning the stressors of health care provision and war-zone exposure, we selected female health care personnel from the National Vietnam Veterans' Readjustment Study (NVVRS; Kulka et al., 1990). Scales germane to women's war-zone and occupational experiences were developed from items embedded in the National Survey of the Vietnam Generation (NSVG), a component of the NVVRS. We included potential stressors that represented a range in objectivity/subjectivity, chronicity, magnitude, and context. Based on previous empirical work on civilians and military personnel, as well as narrative accounts of the Vietnam nursing milieu, we determined that six constructs were relevant to female Vietnam health care providers: (a) personal threat, (b) exposure to wounded and dead, (c) deprivation, (d) dilemmas of war-zone health care, (e) sense of purposelessness, and (f) unit cohesion. Personal threat and exposure to wounded and dead were selected for consonance with the standard for criterion-A stressors. Furthermore, the first three scales were chosen as more objective contextual predictors previously validated on both male and female Vietnam veterans. Informed by civilian burnout models, the latter three scales were selected to measure more subjective occupational experiences pertinent to health care providers, specifically female Vietnam veterans.

Investigations of male and female Vietnam veterans, irrespective of occupation, have implicated perceived threat (e.g., D. W. King, King, Foy, Keane, &

Fairbank, 1999; D. W. King, King, Gudanowski, & Vreven, 1995; Paul, 1985; Stretch, Vail, & Maloney, 1985), exposure to casualties (Stretch et al., 1985), and war-zone physical deprivation (e.g., bad food, insects, and disease) in the onset of posttraumatic stress (Fontana & Rosenheck, 1999; D. W. King et al., 1995). For health care personnel, these conditions were compounded by occupational stressors such as shortages in equipment and personnel and managing unfamiliar injuries, including tropical disease and multiple traumatic amputations. These scenarios yielded stressful ethical dilemmas, such as deciding which soldiers received immediate treatment and which would receive care if time and resources allowed (Brende & Parson, 1985). Health care personnel also encountered the contradiction of providing patchwork care to return their patients to the battlefield (Dewane, 1984).

Ascribing meaning to one's trauma (Carlier, 1999; Frommemberger et al., 1999; Williams, Zinner, & Ellis, 1999) and to one's life (Sutker, Davis, Uddo, & Ditta, 1995) buffers against enduring stress. Yet a sense of purpose may have been difficult to sustain in the Vietnam theater as the increase in successful medical evacuations and better field medicine hastened patients' return to the danger of combat. Furthermore, severe injuries were often treated to stabilize the patient for travel to longer-term facilities stateside where these women would not witness soldiers' recoveries (Dewane, 1984). The lack of continuity of care may have undermined attempts to find a sense of meaning and professional purpose amidst stressful events. A final dimension of the war-zone milieu, unit cohesion, refers to the support network and style that develops in a military unit under high stress conditions. Social cohesion enhances the efficacy of the unit and the well-being of its members (Bliese & Halverson, 1996); similar effects have emerged for staving off burnout in civilian health care providers (Constable & Russell, 1986).

To assess the impact of occupational stressors relative to other life-course factors, we included prewar and postwar predictors of PTSD symptom severity in our model. The prewar variables encompassed milieu characteristics implicated in the onset of war-related PTSD in male or female veterans: childhood family instability (female Vietnam veterans; Fontana, Schwartz, & Rosenheck, 1997), childhood emotional attachment (male Vietnam veterans; McCranie, Hyer, Boudewyns, & Woods, 1992), and predeployment trauma (female Gulf War veterans; Engel, Engel, Campbell, McFall, Russo, & Katon, 1993). Similarly, postwar variables were selected based on previous investigations highlighting the predominance of postwar social support (Fontana et al., 1997; D. W. King et al., 1999; L. A. King, King, Fairbank, Keane, & Adams, 1998) and additional life events (L. A. King et al., 1998) in predicting posttraumatic stress among female Vietnam veterans.

Do the self-reported occupational experiences of health care providers contribute to war-related PTSD symptoms? Furthermore, to what extent do the experiences associated with this occupation compare to prewar, war-zone, and postwar variables validated on both male and female veterans in explaining PTSD symp-

toms? Influenced by the literature on both burnout and Vietnam veteran adjustment, we hypothesized that stressors related to the demands of war-zone health care provision would account for a significant amount of variance, although less than conventional traumatic stressors (e.g., exposure to casualties). More broadly, we expected war-zone characteristics to account for the most variance in PTSD symptom severity compared to prewar and postwar variables. Regarding specific postwar variables, we hypothesized that emotional support would be especially predictive of symptoms, whereas prewar characteristics would not predict PTSD symptoms once we accounted for war-zone and postwar characteristics.

METHOD

Sample

The NVVRS participants constituted a probability sample of 3,016 men and women who served in the armed forces during the Vietnam era. Each veteran was interviewed concerning family history, stressful and traumatic experiences, occupation, and physical and mental health status (Jordan et al., 1991; Kulka et al., 1990). We used the data from 373 women who served a tour of duty as health care personnel in the Vietnam theater (Vietnam, Laos, or Cambodia) between August 5, 1964, and May 7, 1975 (Kulka et al., 1990).

Measures

Following classical test construction methods, we rationally derived scales by generating definitions for prewar and war-zone variables. Next, we selected items potentially applicable to female veterans' prewar and war-zone experiences from the NSVG. In a q-sort task, five raters with extensive background in war-related PTSD placed the items in defined categories. We discarded items for which there was not 100% agreement and computed item-total correlations for each subscale. We discarded items with low intercorrelations while attempting to maintain breadth of content. For subscales composed of items with varying response formats (e.g., Likert scales, dichotomous yes/no), we standardized individual items prior to summation into respective subscales.

Prewar scales. The childhood emotional attachment scale consisted of 11 items concerning perceived support, care, closeness, validation, and warmth from primary childhood caregivers (e.g., "When you were growing up, how much did your (father/relationship) show you affection?"). The childhood family instability scale consisted of seven items reflecting perceived stressors within the childhood home. These included witnessing physical abuse among family members and the instability resulting from the repeated absence of siblings and/or caregivers due to hos-

pitalizations, abandonment, and/or incarcerations (e.g., "While you were growing up, did anyone in your family or household, not including yourself, have a serious illness that kept them in bed or in the hospital or out of work for over six months?"). The prewar traumatic events index consisted of 18 items referring to extremely stressful events that may have occurred during childhood through deployment to Vietnam (e.g., personal life-threatening illness, sexual and nonsexual assault, threat of death or severe injury, natural disasters, and sudden loss of a loved one).

War-zone scales. The personal threat scale consisted of 11 appraisals of personal danger of injury and/or life threat while in the war zone. These items included potentially traumatizing events such as witnessing the injury and killing of others, as well as the veteran's appraisals of specific experiences of harm or potential harm to herself (e.g., "How would you describe your exposure to danger and risk of casualty during your tour[s] of duty?").

The 7-item exposure to wounded and dead scale consisted of potentially traumatizing exposure to war-zone casualties without specifying a particular context such as the medical unit or the surrounding environment (e.g., "How often did you see Americans after they had been wounded in combat?").

The deprivation scale consisted of 11 chronic, low-level stressors resulting from the war-zone environment, including continual inconveniences, physical exertion, and shortages in the war zone (e.g., "Rate for you the level of insects, disease, and filth.").

The dilemmas of war-zone health care scale consisted of stressors involved in caring for the wounded and dying. These three items focused on responsibilities and subsequent decisions that might arise from the position of health care provider in the war zone (e.g., "How often were you forced to decide who to help?").

The five items of the purposelessness scale reflected demoralization and lack of meaning/purpose that might accompany living and working in a war zone (e.g., "While you were in Vietnam, to what extent did you have a sense of doing something important?"; "To what extent did you feel that you did not count as an individual?").

The unit cohesion scale consisted of appraisals of available social support in the war-zone unit. These seven items included perceptions of trust, competence, intimacy, and understanding in relationships among the veteran and her unit leaders and peers (e.g., "How close or tight were you with the people in your unit?").

Postwar scales. We employed three subscales for the postwar social support index: (a) structural support, (b) instrumental support, and (c) emotional support (L. A. King et al., 1998). The 8-item structural support scale measured the size of the veteran's postwar social network and the extent to which she used it (e.g., "Over a year's time about how often do you get together with friends and relatives, like going out together or visiting in each other's homes?"). The 6-item instrumental support scale was operationalized by L. A. King et al. as a measurement of the resources on which a veteran could rely in the event of an emergency (e.g., "Among your friends and rela-

tives is there someone who would lend you $100 to $200 dollars if you needed it for an emergency?"). The emotional support scale was the composite score of 13 items measuring intimate, interpersonal support (e.g., "Can you talk about your deepest problems with at least one of your friends?"). L. A. King et al. combined instrumental and emotional support items into one index of functional support. Given the preference for and ameliorative predominance of emotional support over instrumental support among women (Forbes & Roger, 1999; Piko, 1998), we chose not to aggregate these two subscales. More detailed information regarding social support item selection is reported in L. A. King et al.

We also employed L. A. King et al.'s (1998) count of 17 events in four categories to inventory postwar stressful life events: (a) extremely stressful life events anytime after homecoming, (b) stressful life events within the last year, (c) divorce, and (d) death of a child. Stressful life events within the last year included occupational, financial, and health problems. Extremely stressful life events occurring anytime after homecoming referred to more intense, discrete stressful events such as witnessing a violent death or experiencing a natural disaster. We standardized responses in each category before aggregating items into a single index of postwar stressful life events. More detailed information regarding item selection is reported in L. A. King et al.

Scale Reliabilities

Table 1 shows the Cronbach's alphas and descriptive statistics for the 13 subscales. Nunnally (1978) recommended a cutoff of .80 for items measuring the same construct. Seven of these scales fell just below this recommended cutoff.

PTSD measure. The Mississippi Scale for Combat-Related PTSD (M-PTSD; Keane, Caddell, & Taylor, 1988) is a 35-item, self-report measure that assesses current PTSD symptoms plus frequently accompanying features of the disorder. Five-point Likert responses are summed for a continuous measure of current PTSD symptom severity. The M-PTSD was applied in the NVVRS as one of the key dependent measures for both genders; it outperformed all other self-report measures of PTSD in the survey. It has excellent psychometric properties (Keane et al., 1988; McFall, Smith, MacKay, & Tarver, 1990) and has been validated as a dimensional indicator of war-related stress among both men (e.g., Ruscio, Ruscio, & Keane, 2002) and women (e.g., Wolfe, Schnurr, Brown, & Furey, 1994).

Analyses

We used hierarchical multiple linear regression analysis to examine the additive contributions of the prewar, war-zone, and postwar variables to current PTSD symptom severity. The predictors were entered in three blocks in chronological order: (a) prewar characteristics (including the demographic "prewar educational at-

tainment"), (b) war-zone characteristics (including the demographic "age at entry into the war zone"), and (c) postwar characteristics.

We predicted, on the basis of the results of the multiple regression analysis, that health care dilemmas functioned as an intervening variable between PTSD symptoms and exposure to wounded and dead. Accordingly, we ran a series of post-hoc analyses to examine the possible mediating effects of health care dilemmas on the relationship between exposure to wounded and dead in the war zone and current PTSD symptom severity. We hypothesized that exposure to casualties heightens one's perceived responsibilities and dilemmas as a health care provider, thereby elevating current war-related PTSD symptoms.

RESULTS

Characteristics of the Study Group

Ninety-five percent of the women were White, not of Hispanic heritage; approximately 3% and 2% were Hispanic and African American (not of Hispanic heritage).

TABLE 1
Descriptive Statistics of Prewar, War-Zone, and Postwar Variables and Demographics

Scale	*N*	*Min*	*Max*	*M*	*SD*	*No. of Items*	*Cronbach's Alpha*
Prewar variables							
Childhood attachment	333	5.09	40.00	10.05	7.44	11	.91
Family instability	372	0.00	3.86	0.480	0.59	7	.72
Prewar trauma	373	0.00	10.00	0.800	1.31	18	NA[a]
Educational attainment	372	1.00	5.00	2.010	1.21	1	NA[b]
War-zone variables							
Age at entry into Vietnam	373	21.00	51.00	28.41	7.83	1	NA[b]
Months in Vietnam	372	1.00	60.00	12.64	6.31	1	NA[b]
Cohesion	373	0.83	4.00	3.200	0.58	6	.78
Purposelessness	373	0.00	4.00	1.420	0.84	5	.75
Dilemmas of war-zone health care	373	0.00	4.00	1.420	1.02	3	.76
Deprivation	373	1.45	4.64	2.940	0.69	11	.84
Exposure to wounded and dead	373	0.00	4.00	2.550	0.91	7	.86
Personal threat	373	0.00	2.91	0.920	0.50	11	.77
Postwar variables							
Emotional support	373	0.23	3.15	2.180	0.43	13	.74
Instrumental support	373	0.00	1.00	1.000	1.00	6	.72
Structural support	372	1.00	81.00	26.79	12.56	8	NA[a]
Postwar life events	373	0.00	17.00	4.560	3.58	17	NA[a]

Note. [a]Measure composed of a count of items not expected to covary systematically. [b]Measure composed of a single item. Cronbach's alpha could not be computed.

Sixty-nine percent of the women began their tours of duty during or following the Tet Offensive of 1968. Additional demographic data are presented in Table 1.

As measured on the M-PTSD, 32 of the 373 subjects (8.6%) met criteria for current PTSD according to the cutoff empirically generated by the authors of the NVVRS (cutscore = 89; Kulka et al., 1990). The mean score on the M-PTSD was 63.0 with a standard deviation of 17.7.

Hierarchical Linear Regression

Bivariate correlations revealed a number of significant associations among the predictor variables (Table 2). However, none of these associations surpassed the level of acceptable multicollinearity for independent variables in multiple regression analyses (Lewis-Beck, 1980).

The overall model predicted 58% of the total variance in current PTSD symptom severity (Table 3). The prewar characteristics accounted for 12% of the total variance, the war-zone characteristics accounted for 30%, and the postwar characteristics accounted for 16%. In the overall model, the only demographic characteristic that predicted current posttraumatic stress was age at entry into Vietnam ($\beta = .09$, $p < .05$), and none of the individual prewar characteristics was a significant predictor. The war-zone characteristics that predicted PTSD symptoms were environmental deprivation ($\beta = .15$, $p < .01$), dilemmas of war-zone health care ($\beta = .14$; $p < .01$), unit cohesion ($\beta = -.12$, $p < .01$), and sense of purposelessness ($\beta = .10$, $p < .05$). Characteristics of the postwar milieu that predicted stress reactions were emotional support ($\beta = -.34$, $p < .001$) and structural support ($\beta = -.13$, $p < .01$) as well as stressful life events ($\beta = .21$, $p < .001$).

Post-Hoc Analyses: Examining Mediation

Following Baron and Kenny (1986) and Holmbeck (1997), we performed a series of regressions to explore the possibility that dilemmas of war-zone health care mediated the relationship between exposure to wounded and dead and current PTSD symptoms (Table 4). The following four conditions for mediation were met: (a) the predictor (exposure to wounded and dead) was significantly associated with the criterion (PTSD symptom severity; $r = .24$, $p < .001$), (b) the predictor (exposure to wounded and dead) was significantly associated with the mediator (health care dilemmas; $r = .59$, $p < .001$), (c) the criterion (PTSD symptom severity) was significantly associated with the mediator (health care dilemmas; $r = .45$, $p < .001$), and (d) controlling for the mediator (health care dilemmas) significantly reduced the relationship between the predictor (exposure to wounded and dead) and the criterion (PTSD symptom severity; $r = -.04$, *ns*). Bonferroni correction for multiple comparisons did not alter the pattern of significant results.

TABLE 2

Pearson-Product Moment Correlations Among Prewar, War-Zone, and Postwar Variables and PTSD Symptom Severity

Subscales	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*
1. Prewar attachment	1.00															
2. Family instability	−.34*	1.00														
3. Count of prewar traumas	−.01	.08	1.00													
4. Level of education	.01	−.08	.14*	1.00												
5. Months in Vietnam	.08	−.09	.01	.07	1.00											
6. Age at entry to Vietnam	.15	−.18	.21	.24	.06	1.00										
7. Personal threat	.05	.13*	.18*	.05	.08	−.01	1.00									
8. Unit cohesion	.25*	−.13*	−.08	.02	.02	.01	−.09	1.00								
9. Wounded and dead	.03	.06	.11*	−.00	.08	−.17*	.39*	.01	1.00							
10. Dilemmas of war-zone health care	−.04	.10	.15*	.02	.04	−.09	.42*	−.16*	.59*	1.00						
11. Deprivation	−.12*	.22*	.17*	−.07	−.03	−.18*	.50*	−.32*	.44*	.54*	1.00					
12. Sense of purposelessness	−.22*	.18*	−.00	−.08	−.13*	−.17*	.13*	−.50*	.12*	.25*	.45*	1.00				
13. Postwar emotional support	.33*	−.19*	.04	.11*	−.01	.28*	−.14*	.29*	−.15*	−.31*	−.32*	−.38*	1.00			
14. Postwar instrumental support	.14*	−.06	−.10*	−.01	−.01	.05	−.00	.11*	.02	−.10	−.10	−.08	0.31*	1.00		
15. Postwar structural support	.22*	−.07	.05	.04	−.00	.10	−.00	.14*	−.07	−.10*	−.06	−.19*	0.36*	0.17*	1.00	
16. Mississippi scale score	−.28*	.20*	.04	−.06	.03	−.13*	.29*	−.41*	.24*	.45*	.49*	0.46*	−.64*	−.22*	−.33*	1.00

Note. PTSD = post traumatic stress disorder.

*$p < .05$.

TABLE 3
Summary of Hierarchical Regression Analysis for Prewar, War-Zone, and Postwar Variables Predicting Current PTSD Symptom Severity

Variable	R^2	ΔR^2	*B*	*SE B*	β
Step 1	.12	.12			
Prewar variables					
Prewar education attainment			-2.08	1.67	-.06
Prewar traumatic life events			0.68	0.61	.05
Childhood emotional attachment			-5.74	1.20	.25*
Childhood family instability			3.44	1.41	.13*
Step 2	.42	.30			
Prewar variables					
Prewar education attainment			-.66	1.40	-.02
Prewar traumatic life events			-.40	0.55	-.03
Childhood emotional attachment			-4.06	1.03	-.18*
Childhood family instability			1.20	1.19	.05
War-zone variables					
Age at entry into Vietnam			6.40	0.09	-.03
Months in Vietnam			0.21	0.11	.08
Unit cohesion			-4.31	1.19	-.18*
Sense of purposelessness			3.92	1.22	.17*
Dilemmas of war-zone health care			5.01	1.13	.25*
Deprivation			4.55	1.57	.17*
Exposure to wounded and dead			.46	1.20	-.02
Personal threat			1.90	1.52	.06
Step 3	.58	.16			
Prewar variables					
Prewar education attainment			0.45	1.21	.01
Prewar traumatic life events			-.76	0.49	-.06
Childhood emotional attachment			-1.47	0.92	-.07
Childhood family instability			0.41	1.02	.02
War-zone variables					
Age at entry into vietnam			0.18	0.08	.09*
Months in Vietnam			0.14	0.09	.05
Unit cohesion			-2.85	1.02	-.12*
Sense of purposelessness			2.46	1.06	.10*
Dilemmas of war-zone health care			2.87	0.99	.14*
Deprivation			3.97	1.35	.15*
Exposure to wounded and dead			-0.31	1.04	-.01
Personal threat			1.18	1.31	.04
Postwar variables					
Emotional support			-11.01	1.46	-.34*
Structural support			-2.15	0.63	-.13*
Instrumental support			-0.21	0.43	-.02
Postwar stressful life events			1.47	0.29	.21*

Note. $N = 373$. PTSD = posttraumatic stress disorder.
*$p < .05$.

TABLE 4
Summary of Hierarchical Regression Analysis Demonstrating Mediation of PTSD Symptom Severity and Exposure to Wounded and Dead by Dilemmas of Health Care Provision

Variable	R^2	ΔR^2	*B*	*SE B*	β
Step 1	.06	.06			
Exposure to wounded and dead			5.63	1.21	.24*
Step 2	.20	.14			
Exposure to wounded and dead			−1.04	1.37	−.04
Dilemmas of war-zone health care			10.28	1.24	.48*

Note. $N = 373$. PTSD = posttraumatic stress disorder.
*$p < .05$.

DISCUSSION

Do the self-reported occupational experiences of health care providers directly contribute to war-related PTSD symptoms? How do occupational experiences compare to prewar, additional war-zone, and postwar variables previously implicated in the etiology of war-related PTSD? The multiple regression analysis revealed that chronic war-related distress was directly associated with (in order of magnitude): deprivation, dilemmas of war-zone health care, unit cohesion, and sense of purposelessness. In contrast, the more clearly identifiable criterion-A-war-zone stressors, personal threat and exposure to wounded and dead, were not directly related to outcome in the multivariate model, likely due to the contextual differences in the nature and rate of exposure among these noncombatants relative to combatants. Although stressors of war-zone health care provision were significantly associated with PTSD symptom severity, the magnitudes of these effects were small and slightly less than the effect of environmental deprivation. In summary, exposure to chronic, low to moderate magnitude stressors ranging from environmental deprivation to factors shown to be pertinent to burnout among civilian health care providers (i.e., dilemmas of health care provision, sense of purposelessness, social support from peers and supervisors) appears to result in a cumulative stressor effect of sufficient intensity to affect enduring stress reactivity (D. W. King et al., 1995; D. W. King, King, Foy, & Gudanowski, 1996).

As noted, there was no direct effect for exposure to wounded and dead on PTSD severity in the multivariate model. However, post-hoc analyses revealed that the effect of exposure to wounded and dead was entirely mediated by health care dilemmas. Witnessing catastrophic suffering and death in the war zone may be a necessary though not sufficient factor in the development of chronic posttraumatic stress among these women. Potentially traumatic exposure to casualties appears patho-

genic in this population via its pressure on health care responsibilities. Influx of casualties may have created conditions that violated the philosophical tenets of health care, such as euthanasia or being forced to decide who to treat. These duty-specific dilemmas, heightened by exposure to casualties, in turn appear to influence current PTSD symptoms.

Interpreted as aggregate chronological time periods, war-zone characteristics accounted for the most variance in current PTSD symptom endorsement, followed by postwar characteristics, and, finally, prewar characteristics. None of the individual prewar characteristics was a significant predictor of PTSD symptoms in the overall model. Characteristics of the postwar milieu that predicted stress reactions were emotional and structural support as well as stressful life events. Next to emotional support, the occurrence of postwar stressful life events accounted for the most variance in PTSD symptoms relative to all the prewar, war-zone, and other postwar predictors. This finding underscores the impact of cumulative stressful life events, especially those most proximal to the time of assessment.

Of all the predictors identified in this model, emotional support accounted for the most variance in current PTSD symptoms. Having others to provide material/instrumental support in times of need was not related, whereas postwar emotional and structural support negatively influenced current PTSD symptoms. The presence of intimate others and of a larger, more utilized support network was associated with resistance to PTSD symptoms. Overall, the results support the clinical relevance of war-zone occupational stressors, which contributed significantly, both directly and indirectly, to enduring stress reactions. However, the findings also emphasize the predominance of more recent postwar emotional support and life events in the expression of chronic PTSD symptoms.

LIMITATIONS

Our study has several limitations characteristic of most epidemiological studies. The data were self-reports collected 10 to 20 years after the initial exposure, making them vulnerable to both forgetting and distortion and thereby undermining confidence in objectivity and causal ordering (D. W. King et al., 1995; McNally, 2003). Furthermore, due to greater immediacy, accounts of the postwar milieu are likely more accurate than are reports of prewar and war-zone stressors. Seven of the predictor scales fell just below the recommended cutoff for scales measuring a unitary construct (Nunnally, 1978), and were not designed and validated on a separate population. The low coherence of items in the subscales may be partly due to the context of the items in the interview. There were no specific interview questions for medical personnel. Hence, the interpretation of the questions and subsequent endorsement rates by these women were

likely often affected by the preceding questions (Schwarz, 1999), which applied more aptly to the male veteran experience. This limitation is especially pertinent given the lack of a direct association between PTSD symptom severity and the more consistently identified war-zone criterion-A events (i.e., exposure to wounded and dead and personal threat).

In future investigations, it will be necessary to employ more empirically based scale derivation. Items should be specifically referenced to health care duties to establish the reliability of these constructs in detecting rates of exposure and, further, in determining the relative contributions of these stressors types to predicting variance in self-reported PTSD symptoms. In terms of the dependent variable employed, it is essential to note that PTSD symptom severity as measured in this study is not equivalent to PTSD as a diagnostic entity.

Generalizability is limited by threats to internal validity such as unknown selection factors for entering the military, the lack of random assignment, the lack of assessment of male health care veterans to gauge gender-specific stressors, the lack of information on health care role (i.e., nurse, physician) to gauge responsibility-specific stressors, and the inclusion of only health care providers and Vietnam theater veterans. Given the power provided by the large sample size, circumspection is necessary in interpreting the significant effects, which were only small to moderate. Furthermore, the analytical design was cross-sectional and correlational, precluding any conclusions regarding the identified predictors as causal elements in the etiology of postwar distress. The correlational associations revealed in this study require future confirmation and refinement in a fully specified causal model.

CONCLUSIONS

Despite these limitations, this study complements the extant literature by providing information on the expression of war-related distress specifically among women who cared for casualties in a war-zone medical unit. This study also underscores the utility of employing predictors of burnout and similar subclinical stress reactivity among analog civilian populations to inform multivariate models of chronic war-related distress. The predictors identified here may, in fact, be causal factors in PTSD symptoms or, rather, an epiphenomenal expression of attributions shaped by posttraumatic stress. Regardless, the presentation of chronic war-related distress among these women is significantly affected by retrospective, subjective appraisals not only of war-zone-material duties, but also of one's sense of duty. Lastly, the predominance of both postwar emotional support and stressful life events over all other life span predictors suggests that recency prominently affects stressor primacy in contributing to current war-related symptomatology.

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